

CLAIM AMENDMENTS

Kindly cancel claims 1-13, 42-47, 55, 58, 67-69, 76-77 and 101-117 amend claims 14-17, 21, 32, 48, 56, 59, 61, 65, 66, 70, 71, 74, 75, and 78 and add new claims 118, 119 as shown in the following listing of claims. This listing of claims will replace all prior versions, and listings, of claims in the application.

LISTING OF CLAIMS

1 Claims 1-13 (cancel)

1 Claim 14. (currently amended) ~~The module of claim 13,~~ A beam steering module comprising:
2 one or more beam steering elements, wherein the one or more beam steering elements
3 deflect one or more optical signals in two dimensions,
4 wherein one or more of the first and second deflector arrays includes an LxM array of
5 deflectors, where L and M are integers greater than or equal to one
6 wherein N first and second deflector arrays are stacked to form an NxLxM beam steering
7 module, where N is an integer greater than or equal to 1.

1 Claim 15. (currently amended) The module of claim [[12,]] 14 wherein one or more of the beam
2 steering elements includes a frame, wherein the first and second arrays are coupled to
3 opposite sides of the frame in a staggered configuration.

1 Claim 16. (currently amended) The module of claim 15 wherein the frame includes one or more
2 holes between the two or more arrays [[one]] on at least one side of the frame.

1 Claim 17. (currently amended) The module of claim [[12,]] 14 wherein at least one of the first and
2 second arrays is a double-sided array.

1 Claim 18. (original) The module of claim 17, wherein the double sided array includes two
2 substrates back-to-back, wherein each substrate has one or more deflectors on one side.

1 Claim 19. (original) The module of claim 18 wherein the back-to-back substrates are separated by
2 an air gap.

- 1 Claim 20. (original) The module of claim 17, wherein the double sided array includes a single
2 substrate having one or more deflectors on each side thereof.
- 1 Claim 21. (currently amended) The module of claim ~~[[12,]]~~ 14 wherein the first array includes
2 one or more deflectors configured to rotate about a single first axis.
- 1 Claim 22. (original) The module of claim 21 further comprising relay optics optically coupled to
2 one or more of the first and second deflector arrays.
- 1 Claim 23. (original) The module of claim 21 wherein the second array includes one or more
2 deflectors configured to rotate about a single second axis.
- 1 Claim 24. (original) The module of claim 23 wherein the first axis is substantially perpendicular
2 to the second axis.
- 1 Claim 25. (original) The module of claim 23 wherein the deflectors in the first and second arrays
2 are optically coupled in a one-to-one correspondence.
- 1 Claim 26. (original) The module of claim 23, wherein at least one of the first and second
2 deflector arrays is a double-sided array.
- 1 Claim 27. (original) The module of claim 23 wherein N first and second deflector arrays are
2 stacked.
- 1 Claim 28. (original) The module of claim 23 further comprising relay optics optically coupled to
2 one or more of the first and second deflector arrays.
- 1 Claim 29. (original) The module of claim 21, wherein at least one of the first and second arrays
2 is double-sided array.
- 1 Claim 30. (original) The module of claim 29 wherein the double-sided array includes one or
2 more deflectors on one side configured to rotate about a first axis and one or more
3 deflectors on another side configured to rotate about a second axis.

1 Claim 31. (original) The module of claim 29, wherein N of said double-sided arrays are stacked,
2 wherein N is an integer greater than 1.

1 Claim 32. (currently amended) The module of claim ~~[[12,]]~~ 14 wherein the first deflector array
2 includes one or more dual-axis deflectors configured to rotate about a first axis and a
3 second axis.

1 Claim 33. (original) The module of claim 32 wherein the second array includes one or more
2 fixed deflectors.

1 Claim 34. (original) The module of claim 32, wherein the one or more dual-axis deflectors
2 includes one or more double-sided dual axis deflectors.

1 Claim 35. (original) The module of claim 34, wherein the one or more double-sided dual axis
2 deflectors includes two substrates back-to-back, wherein each substrate has one or more
3 deflectors on one side.

1 Claim 36. (original) The module of claim 35 wherein the back-to-back substrates are separated
2 by an air gap.

1 Claim 37. (original) The module of claim 34, wherein the one or more double-sided dual-axis
2 deflectors includes a single substrate having one or more deflectors on each side thereof.

1 Claim 38. (original) The module of claim 32 wherein the second deflector array includes one or
2 more double-sided fixed deflectors.

1 Claim 39. (original) The module of claim 38, wherein the one or more double-sided fixed
2 deflectors includes two substrates back-to-back, wherein each substrate has one or more
3 deflectors on one side.

1 Claim 40. (original) The module of claim 39 wherein the back-to-back substrates are separated
2 by an air gap.

1 Claim 41. (original) The module of claim 38, wherein the one or more double-sided fixed
2 deflectors includes a single substrate having one or more deflectors on each side thereof.

1 Claims 42-47 (cancel)

1 Claim 48. (currently amended) ~~The switch of claim 42,~~ An optical switch, comprising:

2 a first beam steering module;

3 a second beam steering module optically coupled to the first beam steering module;

4 wherein at least one of the first and second beam steering modules includes at least
5 one beam steering element,

6 wherein the at least one beam steering element deflects an optical signal in two
7 dimensions,

8 wherein the at least one beam steering element includes a stack containing one or
9 more first deflector arrays optically coupled to one or more second deflector arrays
10 wherein one or more of the first and second deflector arrays includes a double sided
11 array having

12 wherein the double sided array has on one side one or more deflectors configured to
13 rotate about a single first axis, the double sided array having on another side one more
14 deflectors configured to rotate about a single second axis; or

15 wherein the double sided array has on one side one or more deflectors configured to
16 rotate about a first axis and a second axis, the double sided array having on another
17 side one more fixed deflectors; or

18 wherein.

1 Claim 49. (original) The switch of claim 48 further comprising relay optics optically coupled to
2 one or more of the first and second beam steering elements.

1 Claim 50. (original) The switch of claim 49, further comprising relay optics coupled to one or
2 more of the first and second modules.

1 Claim 51. (original) The switch of claim 49 wherein the first and second beam steering modules
2 are part of a plurality of first and second beam steering modules disposed along a curved
3 surface.

4 Claim 52. (original) The switch of claim 51 further comprising a fold deflector optically coupled
5 between the first and second beam steering modules.

1 Claim 53. (original) The switch of claim 52 wherein the fold deflector is partially transparent.

1 Claim 54. (original) The fold deflector of claim 53, further comprising a photodetector array
2 optically coupled to the partially transparent fold deflector.

1 Claim 55. (cancel)

1 Claim 56. (currently amended) The switch of claim ~~[[55]]~~ 48 wherein the first and second beam
2 steering modules are part of a plurality of first and second beam steering modules
3 disposed along a curved surface.

1 Claim 57. (original) The switch of claim 56 further comprising a fold deflector optically coupled
2 between the first and second beam steering modules.

1 Claim 58. (cancel)

1 Claim 59. (currently amended) The switch of claim ~~[[58]]~~ 48 wherein the first and second beam
2 steering modules are part of a plurality of first and second beam steering modules
3 disposed along a curved surface.

1 Claim 60. (original) The switch of claim 59 further comprising a fold deflector optically coupled
2 between the first and second beam steering modules.

1 Claim 61. (currently amended) The switch of claim ~~[[42]]~~ 48, further comprising a fold deflector
2 optically coupled between the first and second beam steering modules.

1 Claim 62. (original) The switch of claim 61, wherein the fold deflector is a curved fold mirror.

1 Claim 63. (original) The switch of claim 62, wherein the first and second modules are arranged
2 in a substantially planar configuration.

1 Claim 64. (original) The switch of claim 62, wherein the first and second modules are arranged
2 in a substantially curved configuration.

1 Claim 65. (currently amended) The switch of claim [[42,]] 48 wherein the first and second
2 modules are arranged in a substantially planar configuration.

1 Claim 66. (currently amended) ~~The switch of claim 42,~~ An optical switch, comprising:
2 a first beam steering module;
3 a second beam steering module optically coupled to the first beam steering module;
4 wherein at least one of the first and second beam steering modules includes at least one
5 beam steering element,
6 wherein the at least one beam steering element deflects an optical signal in two
7 dimensions,
8 wherein the first and second modules are arranged in a substantially curved
9 configuration.

1 Claim 67-69. (cancel)

1 Claim 70. (currently amended) ~~The optical switch of claim 71~~ An optical switch comprising:
2 at least one beam steering module having at least one beam steering element, wherein the
3 at least one beam steering element deflects an optical signal in two dimensions,
4 wherein the at least one beam steering module is removable from the switch.

1 Claim 71. (currently amended) The optical switch of claim [[71]] 70 further comprising a power
2 tap optically coupled to the beam steering element, the switch further comprising a
3 controller coupled to beam steering element and the power tap in a feedback loop.

4 Claim 72. (original) The switch of claim 71 further comprising a calibration light source coupled
5 to the beam steering element and power tap.

6 Claim 73. (previously presented) The switch of claim 72 wherein the calibration light source
7 provides a fixed frequency light that doesn't conflict with a signal frequency.

1 Claim 74. (currently amended) The switch of claim [[67,]] 70 wherein the optical signals enter
2 and leave the switch along substantially parallel paths.

1 Claim 75. (currently amended) The switch of claim [[67,]] 70 further comprising one or more
2 collimators optically coupled to the beam steering element.

1 Claims 76-77. (cancel)

1 Claim 78. (currently amended) The switch of claim [[67,]] 70 wherein the at least one beam
2 steering element includes a first deflector array optically coupled to a second deflector
3 array.

1 Claim 79. (original) The switch of claim 78, wherein one or more of the first and second
2 deflector arrays includes an LxM array of deflectors, where L and M are integers greater
3 than or equal to one.

1 Claim 80. (original) The switch of claim 79, wherein N of said LxM arrays are stacked to form
2 an NxLxM beam steering element.

1 Claim 81. (original) The switch of claim 78, wherein the at least one beam steering element
2 includes a frame wherein the first and second arrays are coupled to opposite sides of the
3 frame in a staggered configuration the frame ~~w/holes~~ with holes to let beams pass.

1 Claim 82. (original) The switch of claim 78, wherein at least one of the first and second deflector
2 arrays includes one or more double-sided arrays of deflectors.

1 Claim 83. (original) The switch of claim 78, wherein the first array includes one or more
2 deflectors configured to rotate about a single first axis.

1 Claim 84. (original) The switch of claim 83, wherein the second array includes one or more
2 deflectors configured to rotate about a single second axis.

- 1 Claim 85. (original) The switch of claim 84 wherein the first and second arrays include one or
2 more stacked double-sided arrays.
- 1 Claim 86. (original) The switch of claim 84 wherein the deflectors in the first array are optically
2 coupled to the deflectors in the second array in a one-to-one correspondence.
- 1 Claim 87. (original) The switch of claim 84, further comprising relay optics optically coupled to
2 one or more of the first and second arrays.
- 1 Claim 88. (original) The switch of claim 84 wherein the first axis is substantially perpendicular
2 to the second axis.
- 1 Claim 89. (original) The switch of claim 83, wherein the first and second arrays include one or
2 more double-sided arrays.
- 1 Claim 90. (original) The switch of claim 83, wherein the first and second arrays include one or
2 more stacked double-sided arrays.
- 1 Claim 91. (original) The switch of claim 83, further comprising relay optics optically coupled to
2 one or more of the first and second arrays.
- 1 Claim 92. (original) The switch of claim 78, wherein the first array includes one or more dual-
2 axis deflectors configured to rotate about a first axis and a second axis.
- 1 Claim 93. (original) The switch of claim 92, wherein the second array includes one or more fixed
2 deflectors.
- 1 Claim 94. (original) The switch of claim 93 wherein the one or more fixed deflectors is a single
2 continuous fixed deflector.
- 1 Claim 95. (original) The switch of claim 92, wherein the one or more dual-axis deflectors
2 includes one or more double-sided dual axis deflectors.

1 Claim 96. (original) The switch of claim 95, wherein the second array includes a single
2 continuous fixed deflector.

1 Claim 97. (original) The switch of claim 95 wherein the one or more dual-axis deflectors
2 includes a double-sided dual-axis deflector optically coupled to a double-sided fixed
3 deflector in a sandwich.

1 Claim 98. (original) The switch of claim 97 wherein a plurality of said sandwiches are stacked.

1 Claim 99. (original) The switch of claim 92, wherein one or more of the first and second arrays
2 includes a double-sided array having one or more dual-axis deflectors on one side and
3 one or more fixed deflectors on the other side.

1 Claim 100. (original) The switch of claim. 99, wherein a plurality of said double-sided arrays are
2 stacked.

1 Claims 101-117. (cancel)

1 Claim 118 (new) The switch of claim 66, further comprising a fold deflector coupled to the at
2 least one beam steering module.

1 Claim 119 (new) The switch of claim 70, further comprising a fold deflector coupled to the at
2 least one beam steering module.

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